



1/23

APPROVED	O.G. FIG.	CLASS	SUBCLASS
BY			
DRAFTSMAN			

Gag\_AF110965\_BW\_mod  
ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGGCAAGCTGGACGCCTGGGAGCGCATCCGCC  
TGC GCCCGGCGGCAAGAAGTGCTACATGATGAAGCACCTGGTGTGGGCCAGCCGCGAGCT  
GGAGAAGTTGCCCCGTAACCCCGGCTGCTGGAGACCAGCGAGGGCTGCAAGCAGATCATC  
CGCCAGCTGCACCCCGCCCTGCAGACCGGCAGCGAGGAGCTGAAGAGCCTGTTCAACACCG  
TGGCCACCCTGTACTGCGTGACGAGAAGATCGAGGTCCGCGACACCAAGGAGGCCCTGGA  
CAAGATCGAGGAGGAGCAGAACAAGTGCCAGCAGAAGATCCAGCAGGCCGAGGCCGCCGAC  
AAGGGCAAGGTGAGCCAGAACTACCCCATCGTGAGAACCTGCAGGGCCAGATGGTGCACC  
AGGCCATCAGCCCCCGCACCCCTGAACGCGCTGGGTGAAGGTGATCGAGGAGAAGGCCCTTCA  
CCCCGAGGTGATCCCCATGTTTACCGCCCTGAGCGAGGGCGCCACCCCCAGGACCTGAAC  
ACGATGTTGAACACCGTGGGCGGCCACCAGGCCGCCATGCAGATGCTGAAGGACACCATCA  
ACGAGGAGGCCCGCGAGTGGGACCGCGTGACCCCGTGACGCGGCCCGCCCATCGCCCCCGG  
CCAGATGCGCGAGCCCCGCGGCAGCGACATCGCCGGCACCACCAGCACCCCTGCAGGAGCAG  
ATCGCCTGGATGACCAGCAACCCCCCATCCCCGTGGGCGACATCTACAAGCGGTGGATCA  
TCCTGGGCCTGAACAAGATCGTGCGGATGTACAGCCCCGTGAGCATCCTGGACATCAAGCA  
GGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAG  
CAGAGCACCCAGGAGGTGAAGAACTGGATGACCGACACCCCTGCTGGTGCAGAACGCCAACC  
CCGACTGCAAGACCATCCTGCGCGCTCTCGGCCCGGCGCCAGCCTGGAGGAGATGATGAC  
CGCCTGCCAGGGCGTGGGCGGCCCCAGCCACAAGGCCCGCGTGCTGGCCGAGGCGATGAGC  
CAGGCCAACACCAGCGTGATGATGCAGAAGAGCAACTTCAAGGGCCCCCGGCGCATCGTCA  
AGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAA  
GGGCTGCTGGAAGTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCC  
AACTTCTGCGGCAAGATCTGGCCCAGCCACAAGGGCCGCCCGGCAACTTCTGCGAGAGCC  
GCCCCGAGCCCACCGCCCCCCCCCGCCGAGAGCTTCCGCTTCGAGGAGACCACCCCGGCCA  
GAAGCAGGAGAGCAAGGACCGCGAGACCCTGACCAGCCTGAAGAGCCTGTTCCGGCAACGAC  
CCCCTGAGCCAGTAA

FIG. 1



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Gag\_AF110967\_BW\_mod

ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGAGAAGCTGGACAAGTGGGAGAAGATCCGCC  
TGCGCCCCGGCGGCAAGAAGCACTACATGCTGAAGCACCTGGTGTGGGCCAGCCGCGAGCT  
GGAGGGCTTCGCCCTGAACCCCGGCCTGCTGGAGACCGCCGAGGGCTGCAAGCAGATCATG  
AAGCAGCTGCAGCCCGCCCTGCAGACCGGCACCGAGGAGCTGCGCAGCCTGTACAACACCG  
TGGCCACCCTGTACTGCGTGACGCGGCATCGAGGTCCGCGACACCAAGGAGGCCCTGGA  
CAAGATCGAGGAGGAGCAGAACAAGTCCCAGCAGAAGACCCAGCAGGCCAAGGAGGCCGAC  
GGCAAGGTGAGCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACCAGG  
CCATCAGCCCCCGCACCCCTGAACGCCCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAGCCC  
CGAGGTGATCCCCATGTTACCCGCCCTGAGCGAGGGCGCCACCCCCAGGACCTGAACACG  
ATGTTGAACACCGTGGGCGGCCACCAGGCGCCATGCAGATGCTGAAGGACACCATCAACG  
AGGAGGCCCGCGAGTGGGACCGCCTGCACCCCGTGCAGGCCGCGCCCGTGGCCCCCGGCCA  
GATGCGCGACCCCGCGGCAGCGACATCGCCGGCGCCACCAGCACCCCTGCAGGAGCAGATC  
GCCTGGATGACCAGCAACCCCCCGTGCCCGTGGGCGACATCTACAAGCGGTGGATCATCC  
TGGGCCTGAACAAGATCGTGCGGATGTACAGCCCCGTGAGCATCCTGGACATCCGCCAGGG  
CCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAGCAG  
GCCACCCAGGACGTGAAGAACTGGATGACCGAGACCCTGCTGGTGCAGAACGCCAACCCCG  
ACTGCAAGACCATCCTGCGCGCTCTCGGCCCGGCGCCACCCTGGAGGAGATGATGACCGC  
CTGCCAGGGCGTGGGCGGCCCGGCCACAAGGCCCGCGTGTGCGCGAGGCGATGAGCCAG  
GCCAACAGCGTGAACATCATGATGCAGAAGAGCAACTTCAAGGGCCCCCGGCGCAACGTCA  
AGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCAAGAACTGCCGCGCCCCCGCAAGAA  
GGGCTGCTGGAAGTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCC  
AACTTCCTGGGCAAGATCTGGCCCAGCCACAAGGGCCCGCCCGGCAACTTCCTGCAGAACC  
GCAGCGAGCCCGCCGCCCCCACCCTGCCCCACCGCCCCCCCCCGCGAGAGCTTCCGCTTCGA  
GGAGACCACCCCGCCCCCAAGCAGGAGCCCAAGGACCGCGAGCCCTACCGCGAGCCCTG  
ACCGCCCTGCGCAGCCTGTTGCGCAGCGGCCCCCTGAGCCAGTAA

FIG. 2



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Env\_AF110968\_C\_BW\_opt

--> signal peptide (1-81)  
ATGCGCGTGATGGGCATCCTGAAGAACTACCAGCAGTGGTGGATGTGGGGCATCCTGGGCTTCTGGATGCTGATCA  
TCAGCAGCGTGGTGGGCAACCTGTGGGTGACCGTGTACTACGGCGTGCCCGTGTGGAAGGAGGCCAAGACCACCCCT  
GTTCTGCACCAGCGACGCCAAGGCCTACGAGACCGAGGTGCACAACGTGTGGGGCACCACGCCTGCGTGCCCAACC  
GACCCCAACCCCCAGGAGATCGTGCTGGGAGAACGTGACCGAGAACTTCAACATGTGGAAGAACGACATGGTGGACC  
AGATGCACGAGGACATCATCAGCCTGTGGGACCAGAGCCTGAAGCCCTGCGTGAAGCTGACCCCCCTGTGCGTGAC  
CCTGAAGTGCCGCAACGTGAACGCCACCAACAACATCAACAGCATGATCGACAACAGCAACAAGGGCGAGATGAAG  
AACTGCAGCTTCAACGTGACCACCGAGCTGCGCGACCGCAAGCAGGAGGTGCACGCCCTGTTCTACCGCCTGGACG  
TGGTGGCCCTGCAGGGCAACAACAGCAACGAGTACCGCCTGATCAACTGCAACACCAGCGCCATCACCCAGGCCTG  
CCCCAAGGTGAGCTTCGACCCCATCCCCATCCACTACTGCACCCCCGCCGGCTACGCCATCCTGAAGTGCAACAAC  
CAGACCTTCAACGGCACCAGCCCCCTGCAACAACGTGAGCAGCGTGAGTGCGCCACGGCATCAAGCCCGTGGTGA  
GCACCCAGCTGCTGCTGAACGGCAGCCTGGCCAAGGGCGAGATCATCATCCGAGCGAGAACCTGGCCAACAACGC  
CAAGATCATCATCGTGAGCTGAACAAGCCCGTGAAGATCGTGTGCGTGCGCCCCAACAACAACACCCGCAAGAGC  
GTGCGCATCGGCCCCGCCAGACCTTCTACGCCACCGCGAGATCATCGGCGACATCCGCCAGGCCTACTGCATCA  
TCAACAAGACCGAGTGGAAACAGCACCCCTGCAGGGCGTGAGCAAGAAGCTGGAGGAGCACTTCAGCAAGAAGGCCAT  
CAAGTTCGAGCCCAGCAGCGGGCGGCGACCTGGAGATCACCACCCACAGCTTCAACTGCCGCGGCGAGTTCTTCTAC  
TGCGACACCAGCCAGCTGTTCAACAGCACCTACAGCCCCAGCTTCAACGGCACCGAGAACAGCTGAACGGCACCA  
TCACCATCACCTGCCGCATCAAGCAGATCATCAACATGTGGCAGAAGGTGGGCGCGCCATGTACGCCCCCCCCAT  
CGCCGGCAACCTGACCTGCGAGAGCAACATCACCGGCCTGCTGCTGACCCGCGACGGCGGCAAGACCGGCCCAAC  
GACACCGAGATCTTCCGCCCCGGCGGCGGCGACATGCGCGACAACCTGGCGCAACGAGCTGTACAAGTACAAGGTGG  
TGGAGATCAAGCCCCCTGGGCGTGGCCCCACCGAGGCCAAGCGCCGCGTGGTGGAGCGCGAGAAGCGCGCCGTGGG  
CATCGGCGCCGTGTTCTGGGCTTCTGGGCGCCGCCGGCAGCACCATGGGCGCCGCCAGCATCACCTGACCGTG  
CAGGCCCCGCTGCTGCTGAGCGGCATCGTGAGCAGCAGAACAACTGCTGCGCGCCATCGAGGCCAGCAGCACC  
TGCTGCAGCTGACCGTGTGGGGCATCAAGCAGCTGCAGACCCGCATCCTGGCCGTGGAGCGCTACCTGAAGGACCA  
GCAGCTGCTGGGCATCTGGGGCTGCAGCGGCAAGCTGATCTGCACCACCGCCGTGCCCTGGAACAGCAGCTGGAGC  
AACCGCAGCCACGACGAGATCTGGGACAACATGACCTGGATGCAGTGGGACCGCGAGATCAACAACCTACACCGACA  
CCATCTACCGCCTGCTGGAGGAGAGCCAGAACCAGCAGGAGAAGAACGAGAAGGACCTGCTGGCCCTGGACAGCTG  
GCAGAACCTGTGGAACCTGGTTACAGCATCACCAACTGGCTGTGGTACATCAAGATCTTCATCATGATCGTGGGCGGC  
CTGATCGGCCTGCGCATCATCTTCGCCGTGCTGAGCATCGTGAACCGCGTGCGCCAGGGCTACAGCCCCCTGCCCT  
TCCAGACCCTGACCCCCAACCCCCGCGAGCCCGACCGCCTGGGCGGCATCGAGGAGGAGGGCGGCGAGCAGGACCG  
CGGCCGAGCATCCGCCTGGTGAGCGGCTTCTGGCCCTGGCCTGGGACGACCTGCGCAGCCTGTGCTGTTTACG  
TACCACCGCCTGCGCGACTTCATCCTGATCGCCGCCCGCGTGTGGAGCTGCTGGGCCAGCGCGGCTGGGAGGCCC  
TGAAGTACCTGGGCAGCCTGGTGCAGTACTGGGGCCTGGAGCTGAAGAAGAGCGCCATCAGCCTGCTGGACACCAT  
CGCCATCGCCGTGGCCGAGGGCACCGACCGCATCATCGAGTTTATCCAGCGCATCTGCCGCGCCATCCGCAACATC  
CCCCGCGCATCCGCCAGGGCTTCGAGGCGGCCCTGCAGTAA

FIG. 3



4/23

Env\_AF110975\_C\_BW\_opt

--> signal peptide (1-72) \ / -->  
ATGCGCGTGC GCGGCATCCTGCGCAGCTGGCAGCAGTGGTGGATCTGGGGCATCCTGGGCTTCTGGATCTGCAGCG  
gp120/140/160 (72)  
GCCTGGGCAACCTGTGGGTGACCGTGTACGACGGCGTGCCCGTGTGGCGCGAGGCCAGCACCACCCTGTTCTGCGC  
CAGCGACGCCAAGGCCTACGAGAAGGAGGTGCACAACGTGTGGGCCACCCACGCCTGCGTGCCACCGACCCCAAC  
CCCCAGGAGATCGAGCTGGACAACGTGACCGAGAACTTCAACATGTGGAAGAACGACATGGTGGACCAGATGCACG  
AGGACATCATCAGCCTGTGGGACCAGAGCCTGAAGCCCCGCGTGAAGCTGACCCCCCTGTGCGTGACCCTGAAGTG  
CACCAACTACAGCACCAACTACAGCAACACCATGAACGCCACCAGCTACAACAACAACACCACCGAGGAGATCAAG  
AACTGCACCTTCAACATGACCACCGAGCTGCGCGACAAGAAGCAGCAGGTGTACGCCCTGTTCTACAAGCTGGACA  
TCGTGCCCCCTGAACAGCAACAGCAGCGAGTACCGCCTGATCAACTGCAACACCAGCGCCATCACCCAGGCCTGCCC  
CAAGGTGAGCTTCGACCCCATCCCCATCCACTACTGCGCCCCCGCCGGCTACGCCATCCTGAAGTGCAAGAACAAC  
ACCAGCAACGGCACCGGCCCCCTGCCAGAACGTGAGCACCGTGCAGTGCACCCACGGCATCAAGCCCGTGGTGAGCA  
CCCCCTGCTGCTGAACGGCAGCCTGGCCGAGGGCGGCGAGATCATCATCCGAGCAAGAACCTGAGCAACAACGC  
CTACACCATCATCGTGCACCTGAACGACAGCGTGGAGATCGTGTGCACCCGCCCAACAACAACACCCGCAAGGGC  
ATCCGCATCGGCCCCGCGCAGACCTTCTACGCCACCGAGAACATCATCGGCGACATCCGCCAGGCCCACTGCAACA  
TCAGCGCCGGCGAGTGAACAAGCCGTGCAGCGCGTGAGCGCCAAGCTGCGCGAGCACTTCCCCAACAAGACCAT  
CGAGTTCAGCCCAGCAGCGGCGGCGACCTGGAGATCACCAACCCACAGCTTCAACTGCCGCGGCGAGTTCTTCTAC  
TGCAACACCAGCAAGCTGTTCAACAGCAGCTACAACGGCACCAGCTACCGCGGCACCGAGAGCAACAGCAGCATCA  
TCACCCTGCCCTGCCGCATCAAGCAGATCATCGACATGTGGCAGAAGGTGGGCCGCGCCATCTACGCCCCCCCCAT  
CGAGGGCAACATCACCTGCAGCAGCAGCATCACCGCCTGCTGCTGGCCCGCGACGGCGGCCTGGACAACATCACCC  
ACCGAGATCTTCCGCCCCCAGGGCGGCGACATGAAGGACAACCTGGCGCAACGAGCTGTACAAGTACAAGGTGGTGG  
AGATCAAGCCCTGGGCGTGGCCCCCACCAGAGGCAAGCGCCGCGTGGTGGAGCGCGAGAAGCGCGCCGTGGGCAT  
gp120 (1509) <-- \ / --> (1510) gp41  
CGGCGCCGTGATCTTCGGCTTCTGGGCGCCGCGGCGAGCAACATGGGCGCCGCCAGCATCACCTGACCGCCAG  
GCCCCCAGCTGCTGAGCGGCATCGTGCAGCAGCAGAGCAACCTGCTGCGCGCCATCGAGGCCAGCAGCACATGC  
TGCAGCTGACCGTGTGGGGCATCAAGCAGCTGCAGGCCCGCGTGTGGCCATCGAGCGCTACCTGAAGGACCAGCA  
GCTGCTGGGCATCTGGGGCTGCAGCGGCAAGCTGATCTGCACCACCACCGTGGCCTGGAACAGCAGCTGGAGCAAC  
AAGACCCAGGGCGAGATCTGGGAGAACATGACCTGGATGCAGTGGGACAAGGAGATCAGCAACTACACCGGCATCA  
TCTACCGCCTGCTGGAGGAGAGCCAGAACCAGCAGGAGCAGAACGAGAAGGACCTGCTGGCCCTGGACAGCCGCAA  
CAACCTGTGGAGCTGGTTCAACATCAGCAACTGGCTGTGGTACATCAAGATCTTCATCATGATCGTGGGCGGCCTG  
ATCGGCCTGCGCATCATCTTCGCCGTGCTGAGCATCGTGAACCGCGTGCGCCAGGGCTACAGCCCCCTGAGCTTCC  
AGACCCTGACCCCCAACCCCCGCGCCTGGACCGCCTGGGCCGCATCGAGGAGGAGGGCGGCGAGCAGGACCGCGA  
CCGAGCATCCGCCTGGTGCAGGGCTTCCTGGCCCTGGCCTGGGACGACCTGCGCAGCCTGTGCCTGTTTACGTAC  
CACCGCCTGCGCGACCTGATCCTGGTGACCGCCCGCGTGGTGGAGCTGCTGGGCCGCGAGCAGCCCCCGCGGCCTGC  
AGCGCGGCTGGGAGGCCCTGAAGTACCTGGGCAGCCTGGTGCAGTACTGGGGCCTGGAGCTGAAGAAGAGCGCCAC  
CAGCCTGCTGGACAGCATCGCCATCGCCGTGGCCGAGGGCACCACCGCATCATCGAGGTGATCCAGCGCATCTAC  
CGCGCCTTCTGCAACATCCCCCGCCGCGTGCGCCAGGGCTTCGAGGGCCGCCCTGCAGTAA  
gp160, gp41 (2565) <-- \ /

FIG. 4



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Gag\_AF110965\_BW\_opt

ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGGCAAGCTGGACGCCTGGGAGCGCATCCGCCTGCGCCCCGG  
CGGCAAGAAGTGCTACATGATGAAGCACCTGGTGTGGGCCAGCCGCGAGCTGGAGAAGTTCGCCCTGAACC  
CCGGCCTGCTGGAGACCAGCGAGGGCTGCAAGCAGATCATCCGCCAGCTGCACCCCGCCCTGCAGACCGGC  
AGCGAGGAGCTGAAGAGCCTGTTCAACACCGTGGCCACCCTGTACTGCGTGCACGAGAAGATCGAGGTGCG  
CGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGAGCAGAACAAGAGCCAGCAGAAGATCCAGCAGGCCG  
AGGCCGCGGACAAGGGCAAGGTGAGCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCAC  
CAGGCCATCAGCCCCCGCACCCCTGAACGCCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAGCCCCGAGGT  
GATCCCCATGTTACCGCCCTGAGCGAGGGCGCCACCCCCAGGACCTGAACACCATGCTGAACACCGTGG  
GCGGCCACCAGCGCCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCCGCCGAGTGGGACCGCGTG  
CACCCCGTGCACGCGGCCCCATCGCCCCGGCCAGATGCGCGAGCCCCGCGGCAGCGACATCGCCGGCAC  
CACCAGCACCTGCAGGAGCAGATCGCCTGGATGACCAGCAACCCCCCATCCCCGTGGGCGACATCTACA  
AGCGCTGGATCATCCTGGGCCTGAACAAGATCGTGCGCATGTACAGCCCCGTGAGCATCCTGGACATCAAG  
CAGGGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAGCAGAGCAC  
CCAGGAGGTGAAGAACTGGATGACCGACACCCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCC  
TGCGCGCCCTGGGCCCCGGCGCCAGCCTGGAGGAGATGATGACCGCTGCCAGGGCGTGGGCGGCCCCAGC  
CACAAAGGCCCGCGTGCTGGCCGAGGCGCATGAGCCAGGCCAACACCAGCGTGATGATGCAGAAGAGCAACTT  
CAAGGGCCCCCGCGCATCGTGAAGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCCGCAACTGCCGCG  
CCCCCGCAAGAAGGGCTGCTGGAAGTGCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAG  
GCCAACTTCCTGGGCAAGATCTGGCCCAGCCACAAGGGCCGCCCCGGCAACTTCCTGCAGAGCCGCCCCGA  
GCCACCGCCCCCCCCCGCCGAGAGCTTCCGCTTCGAGGAGACCACCCCGGCCAGAAGCAGGAGAGCAAGG  
ACCGCGAGACCCTGACCAGCCTGAAGAGCCTGTTGCGCAACGACCCCCTGAGCCAGTAA

FIG. 5

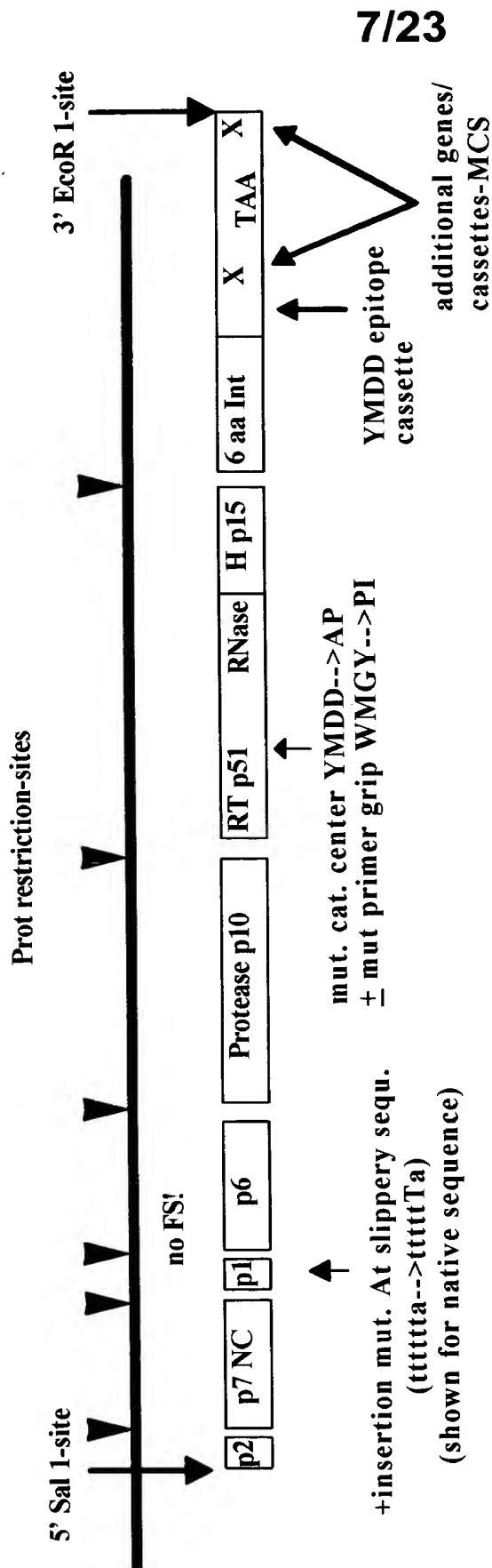


6/23

Gag\_AF110967\_BW\_opt

ATGGGCGCCCGCGCCAGCATCCTGCGCGGCGAGAAGCTGGACAAGTGGGAGAAGATCCGCCTGCGCCCCG  
CGGCAAGAAGCACTACATGCTGAAGCACCTGGTGTGGGCCAGCCGCGAGCTGGAGGGCTTCGCCCTGAACC  
CCGGCCTGCTGGAGACCGCCGAGGGCTGCAAGCAGATCATGAAGCAGCTGCAGCCCGCCCTGCAGACCGGC  
ACCGAGGAGCTGCGCAGCCTGTACAACACCGTGGCCACCCTGTACTGCGTGCACGCCGGCATCGAGGTGCG  
CGACACCAAGGAGGCCCTGGACAAGATCGAGGAGGAGCAGAACAAGAGCCAGCAGAAGACCCAGCAGGCCA  
AGGAGGCCGACGGCAAGGTGAGCCAGAACTACCCCATCGTGCAGAACCTGCAGGGCCAGATGGTGCACCAG  
GCCATCAGCCCCCGCACCCCTGAACGCCTGGGTGAAGGTGATCGAGGAGAAGGCCTTCAGCCCCGAGGTGAT  
CCCCATGTTACCGCCCTGAGCGAGGGCGCCACCCCCCAGGACCTGAACACCATGCTGAACACCGTGGGCG  
GCCACCAGGCCCGCCATGCAGATGCTGAAGGACACCATCAACGAGGAGGCCGCCGAGTGGGACCGCCTGCAC  
CCCGTGCAGGCCGGCCCCGTGGCCCCCGGCCAGATGCGCGACCCCCGCGGCAGCGACATCGCCGGCGCCAC  
CAGCACCCCTGCAGGAGCAGATCGCCTGGATGACCAGCAACCCCCCGTGCCCGTGGGCGACATCTACAAGC  
GCTGGATCATCCTGGGCCTGAACAAGATCGTGGCATGTACAGCCCCGTGAGCATCTGGACATCCGCCAG  
GGCCCCAAGGAGCCCTTCCGCGACTACGTGGACCGCTTCTTCAAGACCCTGCGCGCCGAGCAGGCCACCCA  
GGACGTGAAGAACTGGATGACCGAGACCCTGCTGGTGCAGAACGCCAACCCCGACTGCAAGACCATCCTGC  
GCGCCCTGGGCCCCGGCGCCACCCTGGAGGAGATGATGACCGCCTGCCAGGGCGTGGGCGGCCCCGGCCAC  
AAGGCCCCGCTGCTGGCCGAGGCATGAGCCAGGCCAACAGCGTGAACATCATGATGCAGAAGAGCAACTT  
CAAGGGCCCCCGCGCAACGTGAAGTGCTTCAACTGCGGCAAGGAGGGCCACATCGCCAAGAACTGCCGCG  
CCCCCGCAAGAAGGGCTGCTGGAAGTGC GGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAG  
GCCAACTTCCTGGGCAAGATCTGGCCCAGCCACAAGGGCCGCCCCGGCAACTTCCTGCAGAACCGCAGCGA  
GCCCCGCGCCCCCACCCTGCCCACCGCCCCCCCCCGCCGAGAGCTTCCGCTTCGAGGAGACCACCCCCGCCC  
CCAAGCAGGAGCCCAAGGACCGCGAGCCCTACCGCGAGCCCCTGACCGCCCTGCGCAGCCTGTTTCGGCAGC  
GGCCCCCTGAGCCAGTAA

FIG. 6



**FIG. 7**



8/23

PR975(+) (SEQ ID NO:30)

GTCGACGCCACCATGGCCGAGGCCATGAGCCAGGCCACCAGCGCCAACATCCTGAT  
GCAGCGCAGCAACTTCAAGGGCCCCAAGCGCATCATCAAGTGCTTCAACTGCGGCAA  
GGAGGGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAAGGGGCTGCTGGAAGT  
GCGGCAAGGAGGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTCTTC  
CGCGAGGACCTGGCCTTCCCCCAGGGCAAGGCCCGCGAGTTCCCCAGCGAGCAGAA  
CCGCGCCAACAGCCCCACCAGCCGCGGAGCTGCAGGTGCGCGGCGACAACCCCCGCA  
GCGAGGCCGCGCGCCGAGCGCCAGGGCACCCTGAACCTTCCCCCAGATCACCTGTGGC  
AGCGCCCCCTGGTGAGCATCAAGGTGGGCGGCCAGATCAAGGAGGCCCTGCTGGAC  
ACCGGCGCCGACGACACCGTGCTGGAGGAGATGAGCCTGCCCGGCAAGTGGAAGCC  
CAAGATGATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGATCGGCCCCACCCCCGT  
GAACATCATCGGCCGCAACATGCTGACCCAGCTGGGCTGCACCCTGAACCTTCCCCAT  
CAGCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCCCGGCATGGACGGCCCCAAGG  
TGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTGCGAG  
GAGATGGAGAAGGAGGGCAAGATCACCAAGATCGGCCCCGAGAACCCCTACAACAC  
CCCCGTGTTTCGCCATCAAGAAGAAGGACAGCACCAAGTGGCGCAAGCTGGTGGACT  
TCCGCGAGCTGAACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCC  
ACCCCGCCGGCCTGAAGAAGAAGAAGAGCGTGACCGTGCTGGACGTGGGCGACGCC  
TACTTCAGCGTGCCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTACCATCCCC  
AGCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAACGTGCTGCCCCAGGGC  
TGGAAGGGCAGCCCCAGCATCTTCCAGAGCAGCATGACCAAGATCCTGGAGCCCTTC  
CGCGCCCGCAACCCCGAGATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGC  
AGCGACCTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGCGCAAGCACCT  
GCTGCGCTGGGGCTTACCACCCCCGACAAGAAGCACCAAGAGAGCCCCCTTCTCT  
GTGGATGGGCTACGAGCTGCACCCCGACAAGTGGACCGTGACGCCATCGAGCTGCC  
CGAGAAGGAGAGCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACT  
GGGCCAGCCAGATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCAAGCTGCTGCGCG  
GCGCCAAGGCCCTGACCGACATCGTGCCCTGACCGAGGAGGCCGAGCTGGAGCTG  
GCCGAGAACCGCGAGATCCTGCGCGAGCCCGTGACCGGCGTGTAACGACCCAG  
CAAGGACCTGGTGGCCGAGATCCAGAAGCAGGGCCACGACCAGTGACCTACCAGA  
TCTACCAGGAGCCCTTCAAGAACCTGAAGACCGGCAAGTACGCCAAGATGCGCACC  
GCCACACCAACGACGTGAAGCAGCTGACCGAGGCCGTGCAGAAGATCGCCATGGA  
GAGCATCGTGATCTGGGGCAAGACCCCCAAGTTCCGCTGCCCATCCAGAAGGAGAC  
CTGGGAGACCTGGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTT  
CGTGAACACCCCCCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCAT  
CGGCGCCGAGACCTTCTACGTGGACGGCGCCGCCAACCGCGAGACCAAGATCGGCA  
AGGCCGGCTACGTGACCGACCGGGGCGGCGAGAAGATCGTGAGCCTGACCGAGACC  
ACCAACCAGAAGACCGAGCTGCAGGCCATCCAGCTGGCCCTGCAGGACAGCGGCAG  
CGAGGTGAACATCGTGACCGACAGCCAGTACGCCCTGGGCATCATCCAGGCCAGCC  
CGACAAGAGCGAGAGCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGG  
AGAAGGTGTACCTGAGCTGGGTGCCCGCCACAAGGGCATCGGCGGCAACGAGCAG  
ATCGACAAGCTGGTGAGCAAGGGCATCCGCAAGGTGCTGTTCTTGGACGGCATCGAT  
GGCGGCATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGCAGCGGCGGCCCT  
AGGATCGATTAAAAGCTTCCCGGGGCTAGCACCGGTGAATTC

FIG. 8





9/23

PR975YM (SEQ ID NO:31)

GTCGACGCCACCATGGCCGAGGCCATGAGCCAGGCCACCAGCGCCAACATCCTGAT  
GCAGCGCAGCAACTTCAAGGGCCCCAAGCGCATCATCAAGTGCTTCAACTGCGGCAA  
GGAGGGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAAGGGCTGCTGGAAGT  
GCGGCAAGGAGGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTCTTC  
CGCGAGGACCTGGCCTTCCCCCAGGGCAAGGCCCGCGAGTTCCCCAGCGAGCAGAA  
CCGCGCCAACAGCCCCACCAGCCGCGAGCTGCAGGTGCGCGGCGACAACCCGCGCA  
GCGAGGGCCGGCGCCGAGCGCCAGGGCACCTGAACTTCCCCCAGATCACCTGTGGC  
AGCGCCCCCTGGTGAGCATCAAGGTGGGCGGCCAGATCAAGGAGGGCCCTGCTGGAC  
ACCGGCGCCGACGACACCGTGCTGGAGGAGATGAGCCTGCCCGGCAAGTGGAAGCC  
CAAGATGATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGATCGGCCCCACCCCCGT  
GAACATCATCGGCCGCAACATGCTGACCCAGCTGGGCTGCACCTGAACTTCCCCAT  
CAGCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCCCCGGCATGGACGGCCCCAAGG  
TGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTGCGAG  
GAGATGGAGAAGGAGGGCAAGATCACCAAGATCGGCCCCGAGAACCCCTACAACAC  
CCCCGTGTTCCGCATCAAGAAGAAGGACAGCACCAAGTGGCGCAAGCTGGTGGACT  
TCCGCGAGCTGAACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCCC  
ACCCGCGGGCCTGAAGAAGAAGAAGAGCGTGACCGTGCTGGACGTGGGCGACGCC  
TACTTCAGCGTGCCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTCACCATCCCC  
AGCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAACGTGCTGCCCCAGGGC  
TGGAAGGGCAGCCCCAGCATCTTCCAGAGCAGCATGACCAAGATCCTGGAGCCCTTC  
CGCGCCCCGCAACCCCGAGATCGTGATCTACCAGGCCCCCTGTACGTGGGCAGCGAC  
CTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGCGCAAGCACCTGTGCG  
CTGGGGCTTCACCACCCCCGACAAGAAGCACCAAGAAGGAGCCCCCTTCTGTGGAT  
GGGCTACGAGCTGCACCCCCGACAAGTGGACCGTGACGCCATCGAGCTGCCCCGAGA  
AGGAGAGCTGGACCGTGAACGACATCCAGAAGCTGGTGGGCAAGCTGAACTGGGCC  
AGCCAGATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCAAGCTGCTGCGCGGCGCC  
AAGGCCCTGACCGACATCGTGCCCTGACCGAGGAGGCCGAGCTGGAGCTGGCCGA  
GAACCGCGAGATCCTGCGCGAGCCCGTGACGGCGTGTACTACGACCCCAAGCAAGG  
ACCTGGTGGCCGAGATCCAGAAGCAGGGCCACGACCAAGTGGACCTACCAGATCTAC  
CAGGAGCCCTTCAAGAACCTGAAGACCGGCAAGTACGCCAAGATGCGCACCGCCCA  
CACCAACGACGTGAAGCAGCTGACCGAGGCGGTGCAAGAAGATCGCCATGGAGAGCA  
TCGTGATCTGGGGCAAGACCCCCAAGTTCCGCTGCCATCCAGAAGGAGACCTGGG  
AGACCTGGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCTGTGA  
ACACCCCCCCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCATCGGCG  
CCGAGACCTTCTACGTGGACGGCGCCGCCAACC GCGAGACCAAGATCGGCAAGGCC  
GGCTACGTGACCGACCGGGGCGCGCAGAAGATCGTGAGCCTGACCGAGACCACCAA  
CCAGAAGACCGAGCTGCAGGCCATCCAGCTGGCCCTGCAGGACAGCGGCAGCGAGG  
TGAACATCGTGACCGACAGCCAGTACGCCCTGGGCATCATCCAGGCCAGCCCGACA  
AGAGCGAGAGCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGGAGAAG  
GTGTACCTGAGCTGGGTGCCCGCCACAAGGGCATCGGCGGCAACGAGCAGATCGA  
CAAGCTGGTGAAGGAGGATCCGCAAGGTGCTGTTCTTGGACGGCATCGATGGCG  
GCATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGCAGCGGCGGCCCTAGGA  
TCGATTAAAAGCTTCCCGGGGCTAGCACCGGTGAATTC

FIG. 9

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GTCGACGCCACCATGGCCGAGGCCATGAGCCAGGCCACCAGCGCCAACATCCTGAT  
GCAGCGCAGCAACTTCAAGGGCCCCAAGCGCATCATCAAGTGCTTCAACTGCGGCAA  
GGAGGGCCACATCGCCCGCAACTGCCGCGCCCCCGCAAGAAGGGCTGCTGGAAGT  
GCGGCAAGGAGGGCCACCAGATGAAGGACTGCACCGAGCGCCAGGCCAACTTCTTC  
CGCGAGGACCTGGCCTTCCCCCAGGGCAAGGCCCGCGAGTTCCCCAGCGAGCAGAA  
CCGCGCCAACAGCCCCACCAGCCGCGAGCTGCAGGTGCGCGGCGACAACCCCCGCA  
GCGAGGGCCGGCGCCGAGCGCCAGGGCACCTGAACTTCCCCCAGATCACCTGTGGC  
AGCGCCCCCTGGTGAGCATCAAGGTGGGCGGCCAGATCAAGGAGGCCCTGCTGGAC  
ACCGGCGCCGACGACACCGTGCTGGAGGAGATGAGCCTGCCCGGCAAGTGGAAGCC  
CAAGATGATCGGCGGCATCGGCGGCTTCATCAAGGTGCGCCAGTACGACCAGATCCT  
GATCGAGATCTGCGGCAAGAAGGCCATCGGCACCGTGCTGATCGGCCCCACCCCCGT  
GAACATCATCGGCCGCAACATGCTGACCCAGCTGGGCTGCACCTGAACTTCCCCAT  
CAGCCCCATCGAGACCGTGCCCGTGAAGCTGAAGCCCGGCATGGACGGCCCCAAGG  
TGAAGCAGTGGCCCCCTGACCGAGGAGAAGATCAAGGCCCTGACCGCCATCTGCGAG  
GAGATGGAGAAGGAGGGCAAGATCACCAAGATCGGCCCCGAGAACCCCTACAACAC  
CCCCGTGTTCCGCATCAAGAAGAAGGACAGCACCAAGTGGCGCAAGCTGGTGGACT  
TCCGCGAGCTGAACAAGCGCACCCAGGACTTCTGGGAGGTGCAGCTGGGCATCCCC  
ACCCCGCCGGCCTGAAGAAGAAGAAGAGCGTGACCGTGCTGGACGTGGGCGACGCC  
TACTTCAGCGTGCCCCCTGGACGAGGACTTCCGCAAGTACACCGCCTTCACCATCCCC  
AGCATCAACAACGAGACCCCCGGCATCCGCTACCAGTACAACGTGCTGCCCCAGGGC  
TGGAAGGGCAGCCCCAGCATCTTCCAGAGCAGCATGACCAAGATCCTGGAGCCCTTC  
CGCGCCCGCAACCCCCGAGATCGTGATCTACCAGGCCCCCCCTGTACGTGGGCAGCGAC  
CTGGAGATCGGCCAGCACCGCGCCAAGATCGAGGAGCTGCGCAAGCACCTGCTGCG  
CTGGGGCTTCACCACCCCCGACAAGAAGCACCAAGGAGCCCCCTTCTGCCCCAT  
CGAGCTGCACCCCGACAAGTGGACCGTGACGCCCATCGAGCTGCCCCGAGAAGGAGA  
GCTGGACCGTGAAACGACATCCAGAAGCTGGTGGGCAAGCTGAACTGGGCCAGCCAG  
ATCTACCCCGGCATCAAGGTGCGCCAGCTGTGCAAGCTGCTGCGCGGCGCCAAGGCC  
CTGACCGACATCGTGCCCCCTGACCGAGGAGGCCGAGCTGGAGCTGGCCGAGAACCG  
CGAGATCCTGCGCGAGCCCGTGACGGCGTGTACTACGACCCCAAGGACCTGGT  
GGCCGAGATCCAGAAGCAGGGGCCACGACCAAGTGGACCTACCAGATCTACCAGGAGC  
CCTTCAAGAACCTGAAGACCGGCAAGTACGCCAAGATGCGCACCGGCCACACCAAC  
GACGTGAAGCAGCTGACCGAGGCCGTGCAGAAGATCGCCATGGAGAGCATCGTGAT  
CTGGGGCAAGACCCCCAAGTTCCGCCTGCCCATCCAGAAGGAGACCTGGGAGACCT  
GGTGGACCGACTACTGGCAGGCCACCTGGATCCCCGAGTGGGAGTTCTGTAACACCC  
CCCCCTGGTGAAGCTGTGGTACCAGCTGGAGAAGGAGCCCATCATCGGCGCCGAG  
ACCTTCTACGTGGACGGCGCCGCCAACC GCGAGACCAAGATCGGCAAGGCCGGCTA  
CGTGACCGACCGGGGGCCGCGCAGAAGATCGTGAGCCTGACCGAGACCAACCAAG  
AGACCGAGCTGCAGGCCATCCAGCTGGCCCTGCAGGACAGCGGCAGCGAGGTGAAC  
ATCGTGACCGACAGCCAGTACGCCCTGGGCATCATCCAGGCCCAAGCCGACAAGAG  
CGAGAGCGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGGAGAAGGTGT  
ACCTGAGCTGGGTGCCCGCCCAAGGGCATCGGCGGCAACGAGCAGATCGACAAG  
CTGGTGAGCAAGGGCATCCGCAAGGTGCTGTTCTGGACGGCATCGATGGCGGCATC  
GTGATCTACCAGTACATGGACGACCTGTACGTGGGCAGCGGCGGCCCTAGGATCGAT  
TAAAAGCTTCCCGGGGCTAGCACCGGTGAATTC

FIG. 10



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8\_5\_ZA (SEQ ID NO:33)

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1 TGGAAGGGTT AATTTACTCC AAGAAAAGGC AAGAAATCCT TGATTTGTGG GTCTATCACA
61 CACAAGGCTT CTTCCTTGAT TGGCAAACT ACACACCGGG GCCAGGGGTC AGATATCCAC
121 TGACCTTTGG ATGGTGCTAC AAGCTAGTGC CAGTTGACCC AGGGGAGGTG GAAGAGGCCA
181 ACGGAGGAGA AGACAAGTGT TTGCTACACC CTATGAGCCA ACATGGAGCA GAGGATGAAG
241 ATAGAGAAGT ATTAAAGTGG AAGTTTGACA GCCTCCTAGC ACGCAGACAC ATGGCCCGCG
301 AGCTACATCC GGAGTATTAC AAAGACTGCT GACACAGAAG GGACTTTCCG CCTGGGACTT
361 TCCACTGGGG CGTTCCGGGA GGTGTGGTCT GGGCGGGACT TGGGAGTGGT CAACCCTCAG
421 ATGCTGCATA TAAGCAGCTG CTTTTCGCCT GTACTGGGTC TCTCTCGGTA GACCAGATCT
481 GAGCCTGGGA GCCCTCTGGC TATCTAGGGA ACCCACTGCT TAAGCCTCAA TAAAGCTTGC
541 CTTGAGTGCT TTAAGTAGTG TGTGCCCATC TGTTGTGTGA CTCTGGTAAC TAGAGATCCC
601 TCAGACCTT TGTGGTAGTG TGGAAAATCT CTAGCAGTGG CGCCCGAACA GGGACCAGAA
661 AGTGAAAGTG AGACCAGAGG AGATCTCTCG ACGCAGGACT CGGCTTGCTG AAGTGCACAC
721 GGCAAGAGGC GAGAGGGGCG GCTGGTGAGT ACGCCAATTT TACTTGACTA GCGGAGGCTA
781 GAAGGAGAGA GATGGGTGCG AGAGCGTCAA TATTAAGCGG CGGAAAATTA GATAAATGGG
841 AAAGAATTAG GTTAAGGCCA GGGGGAAAGA AACATTATAT GTTAAACAT CTAGTATGGG
901 CAAGCAGGGA GCTGGAAAGA TTTGCACTTA ACCCTGGCCT GTTAGAAACA TCAGAAGGCT
961 GTAAACAAAT AATAAACAG CTACAACCAG CTCCTCAGAC AGGAACAGAG GAACTTAGAT
1021 CATTATTCAA CACAGTAGCA ACTCTCTATT GTGTACATAA AGGGATAGAG GTACGAGACA
1081 CCAAGGAAGC CTTAGACAAG ATAGAGGAAG AACAAAACAA ATGTCAGCAA AAAGCACAAC
1141 AGGCAAAAGC AGCTGACGAA AAGGTCAGTC AAAATTATCC TATAGTACAG AATGCCCAAG
1201 GGCAAAATGGT ACACCAAGCT ATATCACCTA GAACATTGAA TGCATGGATA AAAGTAATAG
1261 AGGAAAAGGC TTTCAATCCA GAGGAAATAC CCATGTTTAC AGCATTATCA GAAGGAGCCA
1321 CCCCACAAGA TTTAAACACA ATGTTAAATA CAGTGGGGGG ACATCAAGCA GCCATGCAAA
1381 TGTTAAAGA TACCATCAAT GAGGAGGCTG CAGAATGGGA TAGGACACAT CCAGTACATG
1441 CAGGGCCTGT TGCACCAGGC CAGATGAGAG AACCAAGGGG AAGTGACATA GCAGGAACCTA
1501 CTAGTACCCT TCAGGAACAA ATAGCATGGA TGACAAGTAA TCCACCTATT CCAGTAGAAG
1561 ACATCTATAA AAGATGGATA ATTCTGGGGT TAAATAAAAT AGTAAGAATG TATAGCCCTG
1621 TTAGCATTTT GGACATAAAA CAAGGGCCAA AAGAACCCTT TAGAGACTAT GTAGACCGGT
1681 TCTTTAAAC CTTAAGAGCT GAACAAGCTA CACAAGATGT AAAGAATTGG ATGACAGACA
1741 CCTTGTTGGT CCAAATGCG AACCCAGATT GTAAGACCAT TTAAAGAGCA TTAGGACCAG
1801 GGGCCTCATT AGAAGAAATG ATGACAGCAT GTCAGGGAGT GGGAGGACCT AGCCATAAAG
1861 CAAGAGTGTT GGCTGAGGCA ATGAGCCAAG CAAACAGTAA CATACTAGTG CAGAGAAGCA
1921 ATTTTAAAGG CTCTAACAGA ATTATTAAT GTTTCAACTG TGGCAAAGTA GGGCACATAG
1981 CCAGAAATG CAGGGCCCCT AGGAAAAGG GCTGTTGGAA ATGTGGACAG GAAGGACACC
2041 AAATGAAAGA CTGTACTGAG AGGCAGGCTA ATTTTGTAGG GAAAATTTGG CCTTCCCACA
2101 AGGGGAGGCC AGGGAATTTT CTCCAGAACA GACCAGAGCC AACAGCCCCA CCAGCAGAAC
2161 CAACAGCCCC ACCAGCAGAG AGCTTCAGGT TCGAGGAGAC AACCCCCGTG CCGAGGAAGG
2221 AGAAAGAGAG GGAACCTTTA ACTTCCCTCA AATCACTCTT TGGCAGCGAC CCCTTGTCTC
2281 AATAAAAGTA GAGGGCCAGA TAAAGGAGGC TCTCTTAGAC ACAGGAGCAG ATGATACAGT
2341 ATTAGAAGAA ATAGATTTGC CAGGGAAATG GAAACCAAAA ATGATAGGGG GAATTGGAGG
2401 TTTTATCAAA GTAAGACAGT ATGATCAAAT ACTTATAGAA ATTTGTGGAA AAAAGGCTAT
2461 AGGTACAGTA TTAGTAGGGC CTACACCAGT CAACATAATT GGAAGAAATC TGTTAACTCA
2521 GCTTGATGTC AACTAAATTT TTCCAATTAG TCCTATTGAA ACTGTACCAG TAAAATTAAA
2581 ACCAGGAATG GATGGCCCAA AGGTCAAACA ATGGCCATTG ACAGAAGAAA AAATAAAAGC
2641 ATTAACAGCA ATTTGTGAGG AAATGGAGAA GGAAGGAAAA ATTACAAAAA TTGGGCCTGA
2701 TAATCCATAT AACACTCCAG TATTTGCCAT AAAAAAGAAG GACAGTACTA AGTGGAGAAA
2761 ATTAGTAGAT TTCAGGGAAC TCAATAAAAG AACTCAAGAC TTTTGGGAAG TTCAATTAGG
2821 AATACCACAC CCAGCAGGAT TAAAAAGAA AAAATCAGTG ACAGTGCTAG ATGTGGGGGA
2881 TGCATATTTT TCAGTTCCTT TAGATGAAAG CTTCAGGAAA TATACTGCAT TCACCATACC
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FIG. 11-1

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2941 TAGTATAAAC AATGAAACAC CAGGGATTAG ATATCAATAT AATGTGCTGC CACAGGGATG
3001 GAAAGGATCA CCAGCAATAT TCCAGAGTAG CATGACAAAA ATCTTAGAGC CCTTCAGAGC
3061 AAAAAATCCA GACATAGTTA TCTATCAATA TATGGATGAC TTGTATGTAG GATCTGACTT
3121 AGAAATAGGG CAACATAGAG CAAAAATAGA AGAGTTAAGG GAACATTTAT TGAATGGGG
3181 ATTTACAACA CCAGACAAGA AACATCAAAA AGAACCCCA TTTCTTTGGA TGGGGTATGA
3241 ACTCCATCCT GACAAATGGA CAGTACAACC TATACTGCTG CCAGAAAAGG ATAGTTGGAC
3301 TGTCAATGAT ATACAGAAGT TAGTGGGAAA ATTAACTGG GCAAGTCAGA TTTACCCAGG
3361 GATTAAAGTA AGGCAACTCT GTAAACTCCT CAGGGGGGCC AAAGCACTAA CAGACATAGT
3421 ACCACTAACT GAAGAAGCAG AATTAGAATT GGCAGAGAAC AGGGAAATTT TAAGAGAACC
3481 AGTACATGGA GTATATTATG ATCCATCAAA AGACTTGATA GCTGAAATAC AGAAACAGGG
3541 GCATGAACAA TGGACATATC AAATTTATCA AGAACCATTT AAAAACTGA AAACAGGGAA
3601 GTATGCAAAA ATGAGGACTA CCCACACTAA TGATGTAAAA CAGTTAACAG AGGCAGTGCA
3661 AAAAAATAGC ATGGAAAGCA TAGTAATATG GGGAAAGACT CCTAAATTTA GACTACCCAT
3721 CCAAAAAGAA ACATGGGAGA CATGGTGGAC AGACTATTGG CAAGCCACCT GGATCCCTGA
3781 GTGGGAGTTT GTTAATACCC CTCCCCTAGT AAAATTATGG TACCAACTAG AAAAAGATCC
3841 CATAGCAGGA GTAGAACTT TCTATGTAGA TGGAGCAACT AATAGGGAAG CTAAATAGG
3901 AAAAGCAGGG TATGTTACTG ACAGAGGAAG GCAGAAAATT GTTACTCTAA CTAACACAAC
3961 AAATCAGAAG ACTGAGTTAC AAGCAATTC GCTAGCTCTG CAGGATTCAG GATCAGAAGT
4021 AAACATAGTA ACAGACTCAC AGTATGCATT AGGAATCATT CAAGCACAAC CAGATAAGAG
4081 TGACTCAGAG ATATTTAACC AAATAATAGA ACAGTTAATA AACAGGAAA GAATCTACCT
4141 GTCATGGGTA CCAGCACATA AAGGAATTGG GGGAAATGAA CAAGTAGATA AATTAGTAAG
4201 TAAGGGAATT AGGAAAGTGT TGTTTCTAGA TGGAATAGAT AAAGCTCAAG AAGAGCATGA
4261 AAGGTACCAC AGCAATTGGA GAGCAATGGC TAATGAGTTT AATCTGCCAC CCATAGTAGC
4321 AAAAGAAATA GTAGCTAGCT GTGATAAATG TCAGCTAAAA GGGGAAGCCA TACATGGACA
4381 AGTCGACTGT AGTCCAGGGA TATGGCAATT AGATTGTACC CATTTAGAGG GAAAAATCAT
4441 CCTGGTAGCA GTCCATGTAG CTAGTGGCTA CATGGAAGCA GAGGTTATCC CAGCAGAAAC
4501 AGGACAAGAA ACAGCATATT TTATATTAAA ATTAGCAGGA AGATGGCCAG TCAAAGTAAT
4561 ACATACAGAC AATGGCAGTA ATTTTACCAG TACTGCAGTT AAGGCAGCCT GTTGGTGGGC
4621 AGGTATCCAA CAGGAATTTG GAATTCCCTA CAATCCCCAA AGTCAGGGAG TGGTAGAATC
4681 CATGAATAAA GAATTAAAGA AAATAATAGG ACAAGTAAGA GATCAAGCTG AGCACCTTAA
4741 GACAGCAGTA CAAATGGCAG TATTCATTCA CAATTTTAAA AGAAAAGGGG GAATTGGGGG
4801 GTACAGTGCA GGGGAAAGAA TAATAGACAT AATAGCAACA GACATACAAA CTAAAGAATT
4861 ACAAAAACAA ATTATAAGAA TTCAAATTT TCGGGTTTAT TACAGAGACA GCAGAGACCC
4921 TATTTGGAAG GGACCAGCCG AACTACTCTG GAAAGGTGAA GGGGTAGTAG TAATAGAAGA
4981 TAAAGGTGAC ATAAAGGTAG TACCAAGGAG GAAAGCAAAA ATCATTAGAG ATTATGGAAA
5041 ACAGATGGCA GGTGCTGATT GTGTGGCAGG TGGACAGGAT GAAGATTAGA GCATGGAATA
5101 GTTTAGTAAA GCACCATATG TATATATCAA GGAGAGCTAG TGGATGGGTC TACAGACATC
5161 ATTTTGAAAG CAGACATCCA AAAGTAAGTT CAGAAGTACA TATCCCATTA GGGGATGCTA
5221 GATTAGTAAT AAAAACATAT TGGGGTTTGC AGACAGGAGA AAGAGATTGG CATTTGGGTC
5281 ATGGAGTCTC CATAGAATGG AGACTGAGAG AATACAGCAC ACAAGTAGAC CCTGACCTGG
5341 CAGACCAGCT AATTCACATG CATTATTTTG ATTGTTTTAC AGAATCTGCC ATAAGACAAG
5401 CCATATTAGG ACACATAGTT TTTCTAGGT GTGACTATCA AGCAGGACAT AAGAAGGTAG
5461 GATCTCTGCA ATACTTGGA CTGACAGCAT TGATAAAACC AAAAAAGAGA AAGCCACCTC
5521 TGCCTAGTGT TAGAAAATTA GTAGAGGATA GATGGAACGA CCCCAGAAG ACCAGGGGCC
5581 GCAGAGGGAA CCATACAATG AATGGACACT AGAGATTCTA GAAGAACTCA AGCAGGAAGC
5641 TGTGAGACAC TTTCTAGAC CATGGCTCCA TAGCTTAGGA CAATATATCT ATGAAACCTA
5701 TGGGGATACT TGGACGGGAG TTGAAGCTAT AATAAGAGTA CTGCAACAAC TACTGTTTAT
5761 TCATTTTCTA ATTGGATGCC AACATAGCAG AATAGGCATC TTGCGACAGA GAAGAGCAAG
5821 AAATGGAGCC AGTAGATCCT AAATAAAGC CCTGGAACCA TCCAGGAAGC CAACCTAAAA
5881 CAGCTTGTA TAATTGCTTT TGCAAACT GTAGCTATCA TTGTCTAGTT TGCTTTCAGA
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FIG. 11-2

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5941 CAAAAGGTTT AGGCATTTCC TATGGCAGGA AGAAGCGGAG ACAGCGACGA AGCGCTCCTC
6001 CAAGTGGTGA AGATCATCAA AATCCTCTAT CAAAGCAGTA AGTACACATA GTAGATGTAA
6061 TGGTAAGTTT AAGTTTATTT AAAGGAGTAG ATTATAGATT AGGAGTAGGA GCATTGATAG
6121 TAGCACTAAT CATAGCAATA ATAGTGTGGA CCATAGCATA TATAGAATAT AGGAAATTGG
6181 TAAGACAAAA GAAAATAGAC TGGTTAATTA AAAGAATTAG GGAAAGAGCA GAAGACAGTG
6241 GCAATGAGAG TGATGGGGAC ACAGAAGAAT TGTCAACAAT GGTGGATATG GGGCATCTTA
6301 GGCTTCTGGA TGCTAATGAT TTGTAACACG GAGGACTTGT GGGTCACAGT CTACTATGGG
6361 GTACCTGTGT GGAGAGAAGC AAAAACTACT CTATTCTGTG CATCAGATGC TAAAGCATAT
6421 GAGACAGAAG TGCATAATGT CTGGGCTACA CATGCTTGTG TACCCACAGA CCCCACCCCA
6481 CAAGAAAATAG TTTTGGGAAA TGTAACAGAA AATTTTAATA TGTGGAAAAA TAACATGGCA
6541 GATCAGATGC ATGAGGATAT AATCAGTTTA TGGGATCAAA GCCTAAAGCC ATGTGTAAAG
6601 TTGACCCAC TCTGTGTCAC TTTAACTGT ACAGATACAA ATGTTACAGG TAATAGAACT
6661 GTTACAGGTA ATACAAATGA TACCAATATT GCAAATGCTA CATATAAGTA TGAAGAAATG
6721 AAAAATTGCT CTTTCAATGC AACCACAGAA TTAAGAGATA AGAAACATAA AGAGTATGCA
6781 CTCTTTTATA AACTTGATAT AGTACCACCT AATGAAAAATA GTAACAACTT TACATATAGA
6841 TTAATAAATT GCAATACCTC AACCATAACA CAAGCCTGTC CAAAGGTCTC TTTTGACCCG
6901 ATTCTTATAC ATTACTGTGC TCCAGCTGAT TATGCGATTG TAAAGTGTA TAATAAGACA
6961 TTCAATGGGA CAGGACCATG TTATAATGTC AGCACAGTAC AATGTACACA TGGAATTAAG
7021 CCACTGGTAT CAACTCAACT ACTGTTAAAT GGTAAGTAG CAGAAGAAGG GATAATAATT
7081 AGATCTGAAA ATTTGACAGA GAATACCAAA ACAATAATAG TACATCTTAA TGAATCTGTA
7141 GAGATTAATT GTACAAGGCC CAACAATAAT ACAAGGAAAA GTGTAAGGAT AGGACCAGGA
7201 CAAGCATTCT ATGCAACAAA TGACGTAATA GGAAACATAA GACAAGCACA TTGTAACATT
7261 AGTACAGATA GATGGAATAA AACTTTACAA CAGGTAATGA AAAAATTAGG AGAGCATTTT
7321 CCTAATAAAA CAATAAAATT TGAACCACAT GCAGGAGGGG ATCTAGAAAT TACAATGCAT
7381 AGCTTTAATT GTAGAGGAGA ATTTTCTAT TGCAATACAT CAAACCTGTT TAATAGTACA
7441 TACTACCCTA AGAATGGTAC ATACAAATAC AATGGTAATT CAAGCTTACC CATCACACTC
7501 CAATGCAAAA TAAAACAAAT TGTACGCATG TGGCAAGGGG TAGGACAAGC AATGTATGCC
7561 CCTCCCATTG CAGGAAACAT AACATGTAGA TCAAACATCA CAGGAATACT ATTGACACGT
7621 GATGGGGGAT TTAACAACAC AAACAACGAC ACAGAGGAGA CATTCAGACC TGGAGGAGGA
7681 GATATGAGGG ATAAGTGGAG AAGTGAATTA TATAAATATA AAGTGGTAGA AATTAAGCCA
7741 TTGGGAATAG CACCCACTAA GGCAAAAAGA AGAGTGGTGC AGAGAAAAAA AAGAGCAGTG
7801 GGAATAGGAG CTGTGTTTCT TGGGTTCTTG GGAGCAGCAG GAAGCACTAT GGGCGCAGCG
7861 TCAATAACGC TGACGGTACA GGCCAGACAA CTGTTGTCTG GTATAGTGCA ACAGCAAAGC
7921 AATTTGCTGA AGGCTATAGA GGCGCAACAG CATATGTTGC AACTCACAGT CTGGGGCATT
7981 AAGCAGCTCC AGGCGAGAGT CCTGGCTATA GAAAGATACC TAAAGGATCA ACAGCTCCTA
8041 GGGATTTGGG GCTGCTCTGG AAGACTCATC TGCACCACTG CTGTGCCTTG GAACTCCAGT
8101 TGGAGTAATA AATCTGAAGC AGATATTTGG GATAACATGA CTTGGATGCA GTGGGATAGA
8161 GAAATTAATA ATTACACAGA AACAAATATC AGGTTGCTTG AAGACTCGCA AAACCAGCAG
8221 GAAAAGAATG AAAAAGATTT ATTAGAATTG GACAAGTGGA ATAATCTGTG GAATTGGTTT
8281 GACATATCAA ACTGGCTGTG GTATATAAAA ATATTCATAA TGATAGTAGG AGGCTTGATA
8341 GGTTTAAGAA TAATTTTTCG TGTCCTCTCT ATAGTGAATA GAGTTAGGCA GGGATACTCA
8401 CCTTTGTCAT TTCAGACCCT TACCCCAAGC CCGAGGGGAC TCGACAGGCT CGGAGGAATC
8461 GAAGAAGAAG GTGGAGAGCA AGACAGAGAC AGATCCATAC GATTGGTGAG CGGATTCTTG
8521 TCGCTTGCCCT GGGACGATCT GCGGAGCCTG TGCCTCTTCA GCTACCACCG CTTGAGAGAC
8581 TTCATATTAA TTGCAGTGAG GGCAGTGGA CTTCTGGGAC ACAGCAGTCT CAGGGGACTA
8641 CAGAGGGGGT GGGAGATCCT TAAGTATCTG GGAAGTCTTG TGCAGTATTG GGGTCTAGAG
8701 CTAAAAAAGA GTGCTATTAG TCCGCTTGAT ACCATAGCAA TAGCAGTAGC TGAAGGAACA
8761 GATAGGATTA TAGAATTGGT ACAAAGAATT TGTAAGAGCTA TCCTCAACAT ACCTAGGAGA
8821 ATAAGACAGG GCTTTGAAGC AGCTTTGCTA TAAAATGGGA GGCAAGTGGT CAAAACGCAG
8881 CATAGTTGGA TGGCCTGCAG TAAGAGAAAG AATGAGAAGA ACTGAGCCAG CAGCAGAGGG
8941 AGTAGGAGCA GCGTCTCAAG ACTTAGATAG ACATGGGGCA CTTACAAGCA GCAACACACC

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FIG. 11-3



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9001 TGCTACTAAT GAAGCTTGTG CCTGGCTGCA AGCACAAGAG GAGGACGGAG ATGTAGGCTT  
9061 TCCAGTCAGA CCTCAGGTAC CTTTAAGACC AATGACTTAT AAGAGTGCAG TAGATCTCAG  
9121 CTTCTTTTTA AAAGAAAAGG GGGGACTGGA AGGGTTAATT TACTCTAGGA AAAGGCAAGA  
9181 AATCCTTGAT TTGTGGGTCT ATAACACACA AGGCTTCTTC CCTGATTGGC AAAACTACAC  
9241 ATCGGGGCCA GGGGTCCGAT TCCCACTGAC CTTTGGATGG TGCTTCAAGC TAGTACCAGT  
9301 TGACCCAAGG GAGGTGAAAG AGGCCAATGA AGGAGAAGAC AACTGTTTGC TACACCCTAT  
9361 GAGCCAACAT GGAGCAGAGG ATGAAGATAG AGAAGTATTA AAGTGGAAGT TTGACAGCCT  
9421 TCTAGCACAC AGACACATGG CCCGCGAGCT ACATCCGGAG TATTACAAAG ACTGCTGACA  
9481 CAGAAGGGAC TTTCCGCCTG GGACTTTCCA CTGGGGCGTT CCGGGAGGTG TGGTCTGGGC  
9541 GGGACTTGGG AGTGGTCACC CTCAGATGCT GCATATAAGC AGCTGCTTTT CGCTTGTACT  
9601 GGGTCTCTCT CGGTAGACCA GATCTGAGCC TGGGAGCTCT CTGGCTATCT AGGGAACCCA  
9661 CTGCTTAGGC CTCAATAAAG CTTGCCTTGA GTGCTCTAAG TAGTGTGTGC CCATCTGTTG  
9721 TGTGACTCTG GTAAC TAGAG ATCCCTCAGA CCCTTTGTGG TAGTGTGGAA AATCTCTAGC  
9781 A

FIG. 11-4



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**SEQ ID NO:34**

GCTGAGGCAATGAGCCAAGCAACCAGCGCAAACATACTGATGCAGAGAAGCAATTT  
CAAAGGCCCTAAAAGAATTATTAAATGTTTCAACTGTGGCAAGGAAGGGCACATAG  
CTAGAAATTGTAGGGCCCCTAGGAAAAAAGGCTGTTGGAAATGTGGAAAGGAAGGA  
CACCAAATGAAAGACTGTACTGAGAGGCAGGCTAA

**FIG. 12**



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975Pol wt until 6aa Int: (SEQ ID NO:35)

TTTTTTAGGGAAGATTTGGCCTTCCCACAAGGGAAGGCCAGGGAATTTCCCTTCAGAA  
CAGAACAGAGCCAACAGCCCCACCAGCAGAGAGCTTCAAGTTTCGAGGAGACAACCC  
CCGCTCCGAAGCAGGAGCCGAAAGACAGGGAACCCCTTAATTTCCCTCAAATCACTCT  
TTGGCAGCGACCCCTTGTCTCAATAAAAGTAGGGGGTCAAATAAAGGAGGCTCTCTT  
AGACACAGGAGCTGATGATACAGTATTAGAAGAAATGAGTTTGCCAGGAAAATGGA  
AACCAAAAATGATAGGAGGAATTGGAGGTTTTATCAAAGTAAGACAGTATGATCAA  
ATACTTATAGAAATTTGTGGAAGGCTATAGGTACAGTATTAATAGGACCTACA  
CCTGTCAACATAATTGGAAGGAATATGTTGACTCAGCTTGGATGCACACTAAATTTT  
CCAATTAGTCCCATTGAACTGTGCCAGTAAAATTAAGCCAGGAATGGATGGCCCA  
AAGGTTAAACAATGGCCATTGACAGAAGAGAAAATAAAGCATTAAACAGCAATTTG  
TGAAGAAATGGAGAAAGAAGGAAAAATTACAAAAATTGGGCCTGAAAATCCATATA  
ACACTCCAGTATTTGCCATAAAAAAGAAGGACAGTACTAAGTGGAGAAAGTTAGTA  
GATTCAGGGAACCTTAATAAAAGAACTCAAGACTTTTGGGAAGTTCAATTAGGAATA  
CCACACCCAGCAGGGTTAAAAAAGAAAAAATCAGTGACAGTACTGGATGTGGGGGA  
TGCATATTTTTTCAGTTTCCTTTAGATGAGGACTTCAGGAAATATACTGCATTCACCATA  
CCTAGTATAAACAATGAAACACCAGGGATTAGATATCAATATAATGTGCTTCCACAG  
GGATGGAAAGGATCACCATCAATATTCAGAGTAGCATGACAAAAATCTTAGAGCC  
CTTTAGAGCAAGAAATCCAGAAATAGTCATCTATCAATATATGGATGACTTGTATGT  
AGGATCTGACTTAGAAATAGGGCAACATAGAGCAAAAAATAGAGGAGTTAAGAAAAC  
ATCTGTAAAGGTGGGGATTTACCACACCGGACAAGAAACATCAGAAAGAACCCCCA  
TTTCTTTGGATGGGGTATGAACTCCATCCTGACAAATGGACAGTACAGCCTATAGAG  
TTGCCAGAAAAGGAAAGCTGGACTGTCAATGATATACAGAAGTTAGTGGGAAAATT  
AAATTGGGCCAGTCAGATTTACCCAGGAATTAAGTAAGGCAACTTTGTAACTCCT  
TAGGGGGGCCAAAGCACTAACAGATATAGTACCACTAACTGAAGAAGCAGAATTAG  
AATTGGCAGAGAACAGGGAAATTCTAAGAGAACCAGTACATGGAGTATATTATGAC  
CCATCAAAAGACTTGGTAGCTGAAATACAGAAACAGGGGCATGACCAATGGACATA  
TCAAATTTACCAAGAACCATTCAAAAACCTGAAAACAGGGAAGTATGCAAAAATGA  
GGACTGCCACACTAATGATGTAAAACAGTTAACAGAGGCAGTGCAAAAAATAGCT  
ATGGAAAGCATAGTAATATGGGGAAAGACTCCTAAATTTAGACTACCCATCCAAAA  
AGAAACATGGGAGACATGGTGGACAGACTATTGGCAAGCCACCTGGATTCTGAGT  
GGGAGTTTGTAAATACCCCTCCCTTAGTAAAATTATGGTACCAGCTAGAGAAAGAAC  
CCATAATAGGAGCAGAACTTTCTATGTAGATGGAGCAGCTAATAGGGAACTAAA  
ATAGGAAAAGCAGGGTATGTTACTGACAGAGGAAGGCAGAAAATTGTTTCTCTAAC  
AGAAACAACAAATCAGAAGACTGAATTACAAGCAATTCAGCTAGCTTTGCAAGATT  
AGGATCAGAAGTAAACATAGTAACAGACTCACAGTATGCATTAGGAATCATTCAAG  
CACAACCAGATAAGAGTGAATCAGAGTTAGTCAACCAAATAATAGAACAAATTAATA  
AAAAAGGAAAAGGTCTACCTGTCATGGGTACCAGCACATAAAGGAATTGGAGGAAA  
TGAACAAATAGATAAATTAGTAAGTAAGGGAATCAGGAAAGTGCTGTTTCTAGATG  
GAATAGAT

FIG. 13





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**SEQ ID NO:36**

GGCGGCATCGTGATCTACCAGTACATGGACGACCTGTACGTGGGCAGCGGCG  
GC

**FIG. 14**



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**SEQ ID NO: 37**

**GGIVTYQYMDDLTVGSGG**

**FIG. 15**



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12\_5/1ZA (SEQ ID NO:45)

TGGAAGGGTTAATTTACTCCAGGAAAAGGCAAGAGATCCTTGATTTATGGGTCTATC  
ACACACAAGGCTACTTCCCTGATTGGCAAACTACACACCGGGACCAGGGGTCAGA  
TATCCACTGACCTTTGGATGGTGCTTCAAGCTAGTGCCAGTTGACCCAAGGGAAGTA  
GAAGAGGCCAACGGAGGAGAAGACAACCTGTTTGCTACACCCTATGAGCCAGTATGG  
AATGGATGATGAACACAAAGAAGTGTTACAGTGGAAGTTTGACAGCAGCCTAGCAC  
GCAGACACCTGGCCCCGCGAGCTACATCCGGATTATTACAAAGACTGCTGACACAGA  
AGGGACTTTCCGCCTGGGACTTTCCACTGGGGCGTTCCAGGGGGAGTGGTCTGGGGCG  
GGACTGGGAGTGGCCAGCCCTCAGATGCTGCATATAAGCAGCGGCTTTTCGCCTGTA  
CTGGGTCTCTCTAGGTAGACCAGATCCGAGCCTGGGAGCTCTCTGTCTATCTGGGGA  
ACCCACTGCTTAGGCCTCAATAAAGCTTGCCTTGAGTGCTCTAAGTAGTGTGTGCCC  
ATCTGTTGTGTGACTCTGGTAACTCTGGTAACTAGAGATCCCTCAGACCCTTTGTGGT  
AGTGTGGAAAATCTCTAGCAGTGGCGCCCCGAACAGGGACTTGAAAGCGAAAGTGAG  
ACCAGAGAAGATCTCTCGACGCAGGACTCGGCTTGCTGAAGTGCACTCGGCAAGAG  
GCGAGGGGGGGCGACTGGTGAGTACGCCAAAATTTTTTTTGGACTAGCGGAGGCTAGA  
AGGAGAGAGATGGGTGCGAGAGCGTCAATATTAAGAGGGGGGAAAATTAGACAAAT  
GGGAAAAAATTAGGTTACGGCCAGGGGGGAGAAAACACTATATGCTAAAACACCTA  
GTATGGGCAAGCAGAGAGCTGGAAAGATTTGCAGTTAACCCCTGGCCTTTTAGAGAC  
ATCAGACGGATGTAGAC AAATAATAAAAACAGCTACAACCAGCTCTTCAGA  
CAGGAACAGAGGAAATTAGATCATTATTTAACACAGTAGCAACTCTCTATTGTGTAC  
ATAAAGGGATAGATGTACGAGACACCAAGGAAGCCTTAGACAAGATAGAGGAGGA  
ACAAAACAAATGTCAGCAAAAAACACAGCAGGCGGAAGCGGCTGACAAAAAGGTC  
AGTCAAAATTATCCTATAGTGCAGAACCTCCAAGGGCAAATGGTACACCAGGCCAT  
ATCACCTAGAACCTTGAATGCATGGGTAAAAGTAATAGAGGAGAAGGCTTTTAGCC  
CAGAGGTAATACCCATGTTTACAGCATTATCAGAAGGAGCCACCCACAAGATTTA  
AACACCATGTAAATACAGTGGGGGGACATCAAGCAGCCATGCAAATGTTAAAAG  
ATACCATCAATGAGGAGGCTGCAGAATGGGATAGGTTACATCCAGTACATGCAGGG  
CCTGTTGCACCAGGCCAGATGAGAGAACCAAGGGGAAGTGACATAGCAGGAACTA  
CTAGTACCCTTCAAGAACAAATAGCATGGATGACAAGTAACCCACCTATCCCAGTA  
GGGGACATCTATAAAAGGTGGATAATTCTGGGGTTAAATAAAATAGTAAGAATGTA  
CAGCCCTGTCAGCATTTTAGACATAAAAACAAGGACCAAAGGAACCCTTTAGAGACT  
ATGTAGACCGGTTCTTCAAACTTTAAGAGCTGAACAATCTACACAAGAGGTAAAA  
AATTGGATGACAGACACCTTGTTAGTCCAAAATGCGAACCAGATTGTAAGACCATT  
TTAAGAGCATTAGGACCAGGGGCTTCATTAGAAGAAATGATGACAGCATGTCAGGG  
AGTGGGAGGACCTAGCCACAAAGCAAGAGTTTTGGCTGAGGCAATGAGCCAAGCAA  
ACAATACAAGTGTAATGATACAGAAAAGCAATTTTAAAGGCCCTAGAAGAGCTGTT  
AAATGTTTCAACTGTGGCAGGGAAGGGCACATAGCCAGGAATTGCAGGGCCCCCTAG  
GAAAAGGGGCTGTTGGAAATGTGGAAAGGAAGGACACCAAATGAAAGACTGTACT  
GAGAGGCAGGCTAATTTTTTAGGGAAAATTTGGCCTTCCCACAAGGGGAGGCCAGG  
GAATTTCCCTTCAGAGCAGACCAGAGCCAACAGCCCCACCACTAGAACCAACAGCCC  
CACCAGCAGAGAGCTTCAAGTTCAAGGAGACTCCGAAGCAGGAGCCGAAAGACAG  
GGAACCTTTAACTTCCCTCAAATCACTCTTTGGCAGCGACCCCTTGTCTCAATAAAA

FIG. 16-1



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GTAGCGGGCCAAACAAAGGAGGCTCTTTTAGATACAGGAGCAGATGATACAGTACT  
AGAAGAAATAAACTTGCCAGGAAAATGGAAACCAAAAATGATAGGAGGAATTGGA  
GGTTTTATCAAAGTAAGACAGTATGATCAAATACTTATAGAAATTTGTGGAAAAAGG  
GCTATAGGTACAGTATTAGTAGGACCTACACCTGTCAACATAATTGGAAGAAATCTG  
TTGACTCAGCTTGGATGCACACTAAATTTTCCAATTAGCCCCATTGAACTGTACCA  
GTAAAATTAAGCCAGGAATGGATGGCCCAAAGGTTAAACAATGGCCATTGACAGA  
AGAAAAAATAAAAGCATTAAACAGAAATTTGTGAGGAAATGGAGAAGGAAGGAAAA  
ATTACAAAAATTGGGCCTGAAAATCCATATAACACTCCAGTATTTGCCATAAAGAAG  
AAGGACAGTACAAAGTGGAGAAAATTAGTAGATTTTCAGGGAACTCAATAAAAAGAAC  
TCAAGACTTTTGGGAAGTCCAATTAGGAATACCACACCCAGCAGGGTTAAAAAAGA  
AAAAATCAGTGACAGTACTGGATGTGGGAGATGCATATTTTTCAGTCCCTTTAGATG  
AGAGCTTCAGAAAATATACTGCATTACCCATACCTAGTATAAACAATGAAACACCA  
GGGATTAGATATCAATATAATGTTCTTCCACAGGGATGGAAAGGATCACCAGCAA  
TATTCAGAGTAGCATGACAAGAATCTTAGAGCCCTTTAGAACACAAAACCCAGAA  
GTAGTTATCTATCAATATATGGATGACTTATATGTAGGATCTGACTTAGAAATAGGG  
CAACATAGAGCAAAAATAGAGGAGTTAAGAGGACACCTATTGAAATGGGGATTTAC  
CACACCAGACAAGAAACATCAGAAAGAACCCCCATTTCTTTGGATGGGGTATGAAC  
TCCATCCTGACAAATGGACAGTACAGCCTATACAGCTGCCAGAAAAGGAGAGCTGG  
ACTGTCAATGATATACAGAAGTTAGTGGGAAAGTTAAACTGGGCAAGTCAGATTTA  
CCCAGGGATTAAAGTAAGGCAACTGTGTAAACTCCTTAGGGGAGCCAAAGCACTAA  
CAGACATAGTGCCACTGACTGAAGAAGCAGAATTAGAATTGGCTGAGAACAGGGA  
AATTCTAAAAGAACCAGTACATGGAGTATATTATGACCCATCAAAAGATTTAATAG  
CTGAAATACAGAAACAGGGGAATGACCAATGGACATATCAAATTTACCAAGAACC  
ATTTAAAAATCTGAGAACAGGAAAGTATGCAAAAATGAGGACTGCCACACTAATG  
ATGTGAAACAGTTAGCAGAGGCAGTGCAAAAGATAACCCAGGAAAGCATAGTAATA  
TGGGGAAAAACTCCTAAATTTAGACTACCCATCCCCAAAAGAAACATGGGAGACATG  
GTGGTCAGACTATTGGCAAGCCACCTGGATTCTGTAGTGGGAGTTTGTCAATACCCC  
TCCCCTAGTAAAATTGTGGTACCAGCTGGAAAAAGAACCCATAGTAGGGGCAGAAA  
CTTTCTATGTAGATGGAGCAGCCAATAGGGAAACTAAAATAGGAAAAGCAGGGTAT  
GTCCTGACAAAGGAAGGCAGAAAGTTGTTTCCTTCACTGAAACAACAAATCAGAA  
GACTGAATTACAAGCAATTCAGCTAGCTTTGCAGGATTCAGGGCCAGAAGTAAACA  
TAGTAACAGACTCACAGTATGCATTAGGAATCATTCAAGCACAACCAGATAAGAGT  
GAATCAGAATTAGTCAGTCAAATAATAGAACAGTTGATAAAAAAGGAAAAAGTCTA  
CCTATCATGGGTACCAGCACATAAAGGAATTGGAGGAAATGAACAAGTAGACAAAT  
TAGTAAGTAGTGGAATCAGAAAAGTACTGTTTCTAGATGGAATAGATAAAGCTCAA  
GAAGAGCATGAAAAATATCACAGCAATTGGAGAGCAATGGCTAGTGAGTTTAATCT  
GCCACCCATAGTAGCAAAGGAAATAGTAGCCAGCTGTGATAAATGTCAGCTAAAAG  
GGGAAGCCATGCATGGACAAGTCGACTGTAGTCCAGGAATATGGCAATTAGACTGT  
ACACATTTAGAAGGAAAAAATCATCCTAGTAGCAGTCCATGTAGCCAGTGGCTACAT  
GGAAGCAGAGGTTATCCCAGCAGAAACAGGACAAGAAACAGCATACTTTATACTAA  
AATTAGCAGGAAGATGGCCAGTCAAAGTAATACATACAGATAATGGCAGTAATTTCC  
ACCAGTACCGCAGTTAAGGCAGCCTGTTGGTGGGCAGATATCCAACGGGAATTTGG  
AATCCCTACAATCCCCAAAGTCAAGGAGTAGTAGAATCCATGAATAAAGAATTAA

FIG. 16-2



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AGAAAATCATAGGGCAAGTAAGAGATCAAGCTGAGCACCTTAAGACAGCAGTACAA  
ATGGCAGTATTCATTCACAATTTTAAAAGAAAAGGGGGGATTGGGGGGTACAGTGC  
AGGGGAGAGAATAATAGACATAATAGCATCAGACATACAAATAAAGAATTACAAA  
AACAAATTATAAAAATTCAAAATTTTCGGGTTTATTACAGAGACAGCAGAGACCCTA  
TTTGGAAGGACCAGCCAACTACTCTGGAAAGGTGAAGGGGCGAGTAGTAATACAA  
GATAATAGTGATATAAAGGTAGTACCAAGAAGGAAAGCAAAAATCATTAAAGGACTA  
TGGAAAACAGATGGCAGGTGCTGATTGTGTGGCAGGTAGACAGGATGAAGATTAGA  
ACATGGCACAGTTTAGTAAAGCACCATATGTATGTTTCGAGGAGAGCTGATGGATGG  
TTCTACAGACATCATTATGAAAGCAGACACCCAAAAGTAAGTTCAGAAGTACACAT  
CCCATTAGGAGATGCCAGGTTAGTAATAAAAACATATTGGGGTCTGCAGACAGGAG  
AAAGAGCTTGGCATTGTTGGGTCACGGAGTCTCCATAGAATGGAGATTGAGAAGATAT  
AGCACACAAGTAGACCCTGACCTGACAGACCAACTAATTCATATGCATTATTTTGAT  
TGTTTTGCAGAATCTGCCATAAGGAAAGCCATACTAGGACAGATAGTTAGCCCTAA  
GTGTGACTATCAAGCAGGACATAACAAGGTAGGATCTCTACAATACTTGGCACTGA  
CAGCATTGATAAAACCAAAAAAGATAAAGCCACCTCTGCCTAGTGTTAGGAAATTA  
GTAGAGGATAGATGGAACAAGCCCCAGAAGACCAGGGGCGCAGAGGGAACCATA  
CAATGAATGGACACTAGAGCTTTTAGAAGAACTCAAGCAGGAAGCTGTCAGACACT  
TTCCTAGACCATGGCTCCATAACTTAGGACAACATATCTATGAAACCTATGGAGATA  
CTTGACAGGAGTTGAAGCAATAATAAGAATCCTGCAACAATTACTGTTTATTCATT  
TCAGGATTGGGTGCCATCATAGCAGAATAGGCATTTTGCGACAGAGAAGAGCAAGA  
AATGGAGCCAATAGATCCTAACCTAGAACCCTGGAACCATCCAGGAAGTCAGCCTA  
AACTGCTTGTAATGGGTGTTACTGTAAACGTTGCAGCTATCATTGTCTAGTTTGCTT  
TCAGAAAAAAGGCTTAGGCATTTACTATGGCAGGAAGAAGCGGAGACAGCGACGAA  
GCGCTCCTCCAAGCAATAAAGATCATCAAGATCCTCTACCAAAGCAGTAAGTACCG  
AATAGTATATGTAATGTTAGATTTAACTGCAAGAATAGATTCTAGATTAGGAATAGG  
AGCATTGATAGTAGCACTAATCATAGCAATAATAGTGTGGACCATAGTATATATAG  
AATATAGGAAATTGGTAAGGCAAAGGAAAATAGACTGGTTAGTTAAAAGGATTAGG  
GAAAGAGCAGAAGACAGTGGCAATGAGAGCGAGGGGGGATACTGAAGAATTATCGA  
CACTGGTGGATATGGGGCATCTTAGGCTTTTGGATGCTAATGATGTGTAATGTGAA  
GGGCTTGTGGGTACAGTCTACTACGGGGTACCTGTGGGGAGAGAAGCAAAAAT  
ACTCTATTTTGTGCATCAGATGCTAAAGCATATGAGAAAGAAGTGCATAATGTCTG  
GGCTACACATGCCTGTGTACCCACAGACCCCAACCCACAAGAAGTGATTTTGGGC  
AATGTAACAGAAAATTTTAACATGTGGAAAAATGACATGGTGGATCAGATGCAGG  
AAGATATAATCAGTTTATGGGATCAAAGCCTTAAGCCATGTGTAAAATTGACCCCA  
CTCTGTGTCACTTTAAACTGTACAAATGCAACTGTAACTACAATAATACCTCTAAA  
GACATGAAAAATTGCTCTTTCTATGTAACCACAGAATTAAGAGATAAGAAAAAGAA  
AGAAAATGCACTTTTTTATAGACTTGATATAGTACCACTTAATAATAGGAAGAATGG  
GAATATTAACAACTATAGATTAATAAATTGTAATACCTCAGCCATAACACAAGCCTG  
TCCAAAAGTCTCGTTTGACCCAATTCCTATACATTATTGTGCTCCAGCTGGTTATGCG  
CCTCTAAAATGTAATAATAAGAAATTCAATGGAATAGGACCATGCGATAATGTGAG  
CACAGTACAATGTACACATGGAATTAAGCCAGTGGTATCAACTCAATTACTGTAAA  
TGGTAGCCTAGCAGAAGAAGAGATAATAATTAGATCTGAAAATCTGACAAACAATG  
TCAAAACAATAATAGTACATCTTAATGAATCTATAGAGATTAAATGTACAAGACC

FIG. 16-3

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TGGCAATAATACAAGAAAGAGTGTGAGAATAGGACCAGGACAAGCATTCTATGCA  
ACAGGAGACATAATAGGAGATATAAGACAAGCACATTGTAACATTAGTAAAAATGA  
ATGGAATACAACCTTTACAAAGGGTAAGTCAAAAATTACAAGAACTCTTCCCTAATA  
GTACAGGGGATAAAATTTGCACCACACTCAGGAGGGGACCTAGAAATTACTACACAT  
AGCTTTAATTGTGGAGGAGAATTTTTCTATTGCAATACAACAGACCTGTTAATAGT  
ACATACAGTAATGGTACATGCACTAATGGTACATGCATGTCTAATAATACAGAGCG  
CATCACACTCCAATGCAGAATAAAACAAATTATAAACATGTGGCAGGAGGTAGGAC  
GAGCAATGTATGCCCCCTCCCATTTGCAGGAAACATAACATGTAGATCAAATATTACA  
GGACTACTATTAACACGTGATGGAGGAGATAATAATACTGAAACAGAGACATTCAG  
ACCTGGAGGAGGAGACATGAGGGGACAATTGGAGAAGTGAATTATATAAATACAAG  
GTGGTAGAAATTAAACCATTAGGAGTAGCACCCACTGCTGCAAAAAGGAGAGTGGT  
GGAGAGAGAAAAAAGAGCAGTAGGAATAGGAGCTGTGTTCCCTTGGGTTCTTGGGAG  
CAGCAGGAAGCACTATGGGCGCAGCATCAATAACGCTGACGGTACAGGCCAGACAA  
TTATTGTCTGGTATAGTGCAACAGCAAAGTAATTTGCTGAGGGCTATAGAGGCGCAA  
CAGCATATGTTGCAACTCACGGTCTGGGGCATTAAAGCAGCTCCAGGCAAGAGTCCTG  
GCTATAGAGAGATACCTACAGGATCAACAGCTCCTAGGACTGTGGGGCTGCTCTGG  
AAAACCTCATCTGCACCACTAATGTGCTTTGGAACCTCTAGTTGGAGTAATAAACTCA  
AAGTGATATTTGGGATAACATGACCTGGATGCAGTGGGATAGGGAAATTAGTAATT  
ACACAAACACAATATACAGGTTGCTTGAAGACTCGCAAAGCCAGCAGGAAAGAAA  
TGAAAAAGATTTACTAGCATTGGACAGGTGGAACAATCTGTGGAATTGGTTTAGCAT  
AACAAATTGGCTGTGGTATATAAAAATATTCATAATGATAGTAGGAGGCTTGATAG  
GTTTAAGAATAATTTTTGCTGTGCTCTCTCTAGTAAATAGAGTTAGGCAGGGATACT  
CACCCCTTGTCATTGCAGACCCCTTATCCCAAACCCGAGGGGACCCGACAGGCTCGGA  
GGAATCGAAGAAGAAGGTGGAGAGCAAGACAGCAGCAGATCCATTTCGATTAGTGA  
GCGGATTCTTGACACTTGCTTGGGACGACCTACGAAGCCTGTGCCTCTTCTGCTACC  
ACCGATTGAGAGACTTCATATTAATTGTAGTGAGAGCAGTGGAACTTCTGGGACAC  
AGTAGTCTCAGGGGACTGCAGAGGGGGTGGGGAACCCCTTAAGTATTTGGGGAGTCT  
TGTGCAATATTGGGGTCTAGAGTTAAAAAAGAGTGCTATTAATCTGCTTGATACTAT  
AGCAATAGCAGTAGCTGAAGGAACAGATAGGATTCTAGAATTCATACAAAACCTTT  
GTAGAGGTATCCGCAACGTACCTAGAAGAATAAGACAGGGCTTCGAAGCAGCTTTG  
CAATAAAATGGGGGGCAAGTGGTCAAAAAGCAGTATAATTGGATGGCCTGAAGTAA  
GAGAAAGAATCAGACGAACTAGGTGAGCAGCAGAGGGAGTAGGATCAGCGTCTCA  
AGACTTAGAGAAACATGGGGCACTTACAACCAGCAACACAGCCCACAACAATGCTG  
CTTGCGCCTGGCTGGAAGCGCAAGAGGAGGAAGGAGAAGTAGGCTTTCCAGTCAGA  
CCTCAGGTACCTTTAAGACCAATGACTTATAAAGCAGCAATAGATCTCAGCTTCTTT  
TTAAAAGAAAAGGGGGGACTGGAAGGGTTAATTTACTCCAAGAAAAGGCAAGAGAT  
CCTTGATTTGTGGGTTTATAACACACAAGGCTTCTTCCCTGATTGGCAAACTACAC  
ACCGGGACCAGGGGTGAGATTTCCACTGACCTTTGGATGGTACTTCAAGCTAGAGCC  
AGTCGATCCAAGGGAAGTAGAAGAGGCCAATGAAGGAGAGAAAACAACTGTTTACTAC  
ACCCTATGAGCCAGCATGGAATGGAGGATGAAGACAGAGAAAGTATTAAGATGGAAG  
TTTGACAGTACGCTAGCACGCAGACACATGGCCCGCGAGCTACATCCGGAGTATTAC  
AAAGACTGCTGACACAGAAGGGACTTTCCGCTGGGACTTTCCACTGGGGCGTTCCAG  
GAGGTGTGGTCTGGGCGGGACAGGGGAGTGGTCAGCCCTGAGATGCTGCATATAAG  
CAGCTGCTTTTCGCCTGTACTGGGTCTCTCTAGGTAGACCAGATCTGAGCCCGGGAG

FIG. 16-4



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CTCTCTGGCTATCTAGGGAACCCACTGCTTAAGCCCTCAATAAAGCTTGCCCTTGAGTG  
CCTTGAGTAGTGTGTGCCCCGTCTGTGTGACTCTGTGTAAGTAGAGATCCCTCAGA  
CCACTTGTGGTAGTGTGGAAAATCTCTAGCA

FIG. 16-5